



[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Parts 429 and 430

[Docket No. EERE-2011-BT-TP-0012]

RIN: 1904-AC45

Energy Conservation Program: Test Procedures for General Service Fluorescent Lamps, General Service Incandescent Lamps, and Incandescent Reflector Lamps

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Final rule.

SUMMARY: On September 14, 2011, the U.S. Department of Energy (DOE) issued a notice of proposed rulemaking (NOPR) to amend the test procedures for general service fluorescent lamps (GSFLs), general service incandescent lamps (GSILs), and incandescent reflector lamps (IRLs). That proposed rulemaking serves as the basis for today's action. DOE is amending its test procedures for GSFLs and GSILs established under the Energy Policy and Conservation Act (EPCA). DOE is not amending in this final rule the existing test procedure for IRLs established under EPCA. For GSFLs and GSILs, DOE is updating several references to the industry standards referenced in DOE's test procedures. DOE is also establishing a lamp lifetime test procedure for GSILs. These test procedures also provide the protocols upon which the Federal Trade Commission bases its energy guide label for these products. DOE's review of the GSFL,

GSIL, and IRL test procedures fulfills the EPCA requirement that DOE review test procedures for all covered products at least once every seven years.

DATES: The effective date of this rule is **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The final rule changes will be mandatory for product testing starting **[INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

The incorporation by reference of certain publications listed in this rule is approved by the Director of the Federal Register on **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: The docket is available for review at regulations.gov, including Federal Register notices, framework documents, public meeting attendee lists and transcripts, comments, and other supporting documents/materials. All documents in the docket are listed in the regulations.gov index. However, not all documents listed in the index may be publicly available, such as information that is exempt from public disclosure.

A link to the docket web page can be found at: www.regulations.gov. This web page will contain a link to the docket for this notice on the regulations.gov site. The regulations.gov web page will contain simple instructions on how to access all documents, including public comments, in the docket.

For further information on how to review the docket, contact Ms. Brenda Edwards at (202) 586-2945 or by email: Brenda.Edwards@ee.doe.gov.

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SUPPLEMENTARY INFORMATION:

This final rule incorporates by reference into Part 430 the following industry standard:

IESNA LM-49-01 (“IESNA LM-49”), IESNA Approved Method for Life Testing of Incandescent Filament Lamps, approved December 1, 2001.

Copies of IES standards can be purchased from the Illuminating Engineering Society (IES), 120 Wall Street, Floor 17, New York, NY 10005-4001, 212-248-5000, or <http://www.ies.org/store/>.

You can also view copies of this standard at the U.S. Department of Energy, Building Technologies Program, 950 L’Enfant Plaza, SW., 6th Floor, Washington, DC, 20024, (202) 586-

2945, between 9:00 a.m. and 4:00 p.m., Monday through Friday, except Federal holidays. Please call Ms. Brenda Edwards at the above telephone number for additional information.

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I. Authority and Background

Title III of the Energy Policy and Conservation Act (42 U.S.C. 6291, et seq.; “EPCA” or, “the Act”) sets forth a variety of provisions designed to improve energy efficiency. (All references to EPCA refer to the statute as amended through the Energy Independence and Security Act of 2007 (EISA 2007), Pub. L. 110-140 (Dec. 19, 2007)). Part B of title III, which for editorial reasons was redesignated as Part A upon incorporation into the U.S. Code (42 U.S.C. 6291–6309), establishes the “Energy Conservation Program for Consumer Products Other Than Automobiles.” These include general service fluorescent lamps (GSFLs), general service incandescent lamps (GSILs), and incandescent reflector lamps (IRLs), the subject of today’s notice. (42 U.S.C. 6292(a)(14) and 6295(i))

Under EPCA, this program consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. The testing requirements consist of test procedures that manufacturers of covered products must use (1) as the basis for certifying to DOE that their products comply with the applicable energy conservation standards adopted under EPCA, and (2) for making representations about the efficiency of those products, including on the Federal Trade Commission’s EnergyGuide label. Similarly, DOE must use these test requirements to determine whether the products comply with any relevant standards promulgated under EPCA. However, to ensure that DOE is in full compliance with Section 315 of Public Law 112-74, DOE will not finalize in this document provisions related to certifying lamps subject to that provision of law. DOE may finalize those procedures at an appropriate time in the future.

Relevant to this rulemaking, EPCA, as codified, directs DOE to prescribe test procedures for GSFLs and IRLs, taking into consideration the applicable standards of the Illuminating Engineering Society of North America¹ (IESNA) or the American National Standards Institute² (ANSI). (42 U.S.C. 6293(b)(6))

In addition, on December 19, 2007, the Energy Independence and Security Act of 2007 (EISA 2007), Pub. L. 110-140, was enacted. Section 321 of EISA 2007 amended EPCA, in relevant part, to prescribe energy conservation standards for GSILs that included maximum rated wattage and minimum rated lifetime requirements for several different lumen ranges; these standards will be phased in between 2012 and 2014. (42 U.S.C. 6295(i)) Section 302 of EISA 2007 also amended EPCA to require DOE to review test procedures for all covered products at least once every seven years. DOE must either amend the test procedures or publish notice in the Federal Register of any determination not to amend a test procedure. (42 U.S.C. 6293(b)(1)(A))

In order to 1) fulfill the statutory requirements for periodic review of test procedures and 2) create for the first time a lifetime test procedure for GSILs, consistent with the minimum rated lifetime requirements set forth in EPCA, DOE published a notice of proposed rulemaking (NOPR) in the Federal Register on September 14, 2011. DOE also invited comment on all aspects of the existing test procedures for GSFLs, GSILs, and IRLs that appear at Title 10 of the Code of Federal Regulations (CFR): 10 CFR 429.27 (“General service fluorescent lamps, general service incandescent lamps, and incandescent reflector lamps”), 10 CFR 430.2 (“Definitions”), 10 CFR 430.3 (“Materials incorporated by reference”), 10 CFR 430.23 (“Test procedures for the

¹ Illuminating Engineering Society of North America (IESNA) standards can be purchased on the IESNA website at: www.ies.org/store/.

² American National Standards Institute (ANSI) standards can be purchased on the ANSI website at: www.webstore.ansi.org/.

measurement of energy and water consumption”), 10 CFR 430.25 (“Laboratory Accreditation Program”), and 10 CFR part 430 subpart B, Appendix R (“Uniform Test Method for Measuring Average Lamp Efficacy (LE), Color Rendering Index (CRI), and Correlated Color Temperature (CCT) of Electric Lamps”). 76 FR 56661, 56662 (September 14, 2011). DOE subsequently held a public meeting on October 4, 2011 to discuss the proposals in the NOPR and invited written comments through November 28, 2011.

To address prior EPCA requirements for GSFLs, GSILs, and IRLs, DOE has previously undertaken a number of rulemaking actions pertaining to the test procedures for these products. For further details refer to the NOPR. 76 FR 56661, 56662-63. Test procedures for GSFLs, GSILs, and IRLs are specified in various sections of the CFR and are based on the 1997 and 2009 final rules addressing test procedures for fluorescent and incandescent lamps. 62 FR 29221 (May 29, 1997); 74 FR 31829 (July 6, 2009); 74 FR 34080 (July 14, 2009). Prior to this final rule, DOE had no test procedure for measuring GSIL lifetime. Calculations for lamp efficacy of GSFLs, GSILs, and IRLs and for color rendering index of GSFLs are discussed in 10 CFR 430.23, which references 10 CFR part 430, subpart B, Appendix R. Appendix R specifies several IESNA and ANSI standards to use for test conditions and procedures. For GSFLs, it references measurement procedures set forth in IESNA LM-9-1999.³ Additionally, GSFLs are to be operated according to general procedures for taking electrical measurements described in ANSI C78.375-1997,⁴ and at the voltage and current conditions described in ANSI C78.81-2005

³ “IESNA Approved Method for the Electrical and Photometric Measurements of Fluorescent Lamps” (approved Dec. 4, 1999).

⁴ “American National Standard for electric lamps: Fluorescent Lamps-Guide for Electrical Measurements” (approved Sept. 25, 1997).

(double-based lamps)⁵ or ANSI C78.901-2005 (single-based lamps),⁶ and using the reference ballast at input voltage specified by the reference circuit in ANSI C82.3-2002.⁷ Appendix R also notes that the prior measurement procedures for GSILs and IRLs are set forth in IESNA LM-45-2000⁸ and IESNA LM-20-1994,⁹ respectively.

General Test Procedure Rulemaking Process

Under 42 U.S.C. 6293, EPCA sets forth the criteria and procedures DOE must follow when prescribing or amending test procedures for covered products. EPCA provides that any test procedures prescribed or amended under this section shall be reasonably designed to produce test results which measure energy efficiency, energy use or estimated annual operating cost of a covered product during a representative average use cycle or period of use and shall not be unduly burdensome to conduct. (42 U.S.C. 6293(b)(3))

In addition, if DOE determines that a test procedure amendment is warranted, it must publish proposed test procedures and offer the public an opportunity to present oral and written comments on them. (42 U.S.C. 6293(b)(2)) Finally, in any rulemaking to amend a test procedure, DOE must determine to what extent, if any, the proposed test procedure would alter the measured energy efficiency of any covered product as determined under the existing test procedure. (42 U.S.C. 6293(e)(1)). If DOE determines that the amended test procedure would

⁵ “American National Standard for Electric Lamps Double-Capped Fluorescent Lamps—Dimensional and Electrical Characteristics” (approved August 11, 2005).

⁶ “American National Standard for Electric Lamps Double-Capped Fluorescent Lamps—Dimensional and Electrical Characteristics” (approved March 23, 2005).

⁷ “American National Standard For Lamp Ballasts -Reference Ballasts for Fluorescent Lamps” (approved Sept. 4, 2002).

⁸ “IESNA Approved Method for Electrical and Photometric Measurements of General Service Incandescent Filament Lamps” (approved May 8, 2000).

⁹ “IESNA Approved Method for Photometric Testing Of Reflector-Type Lamps” (approved Dec. 3, 1994).

alter the measured efficiency of a covered product, DOE must amend the applicable energy conservation standard accordingly. (42 U.S.C. 6293(e)(2)).

With respect to today's rulemaking, DOE has determined that none of the amendments it is adopting will change the measured efficacy of the GSFLs, GSILs, or IRLs when compared to the previously existing test procedures.

II. Summary of the Final Rule

Today's rule amends DOE's test procedures for GSFLs and GSILs. The amendments achieve two objectives: (1) update test procedures by incorporating certain lighting industry standards by reference in order to adopt current best practices and technological developments and (2) establish a new test procedure for determining GSIL rated lifetime, consistent with the minimum rated lifetime requirements in set forth in EPCA.

Regarding the first objective, this final rule updates industry standards previously incorporated by reference to the latest versions of those documents. For GSFLs, DOE is updating dimensional and electrical characteristic-related references to ANSI C78.81-2003 as well as ANSI C78.81-2005 to ANSI C78.81-2010,¹⁰ and references to IESNA LM-9-1999¹¹ to IES LM-9-2009¹² for measuring electrical and photometric attributes. For GSILs, DOE is updating references of IESNA LM-45-2000 to IES LM-45-2009¹³ for measuring electrical and

¹⁰ "American National Standard for Electric Lamps-Double-Capped Fluorescent Lamps-Dimensional and Electrical Characteristics" (approved Jan. 14, 2010).

¹¹ "IESNA Approved Method for the Electrical and Photometric Measurements of Fluorescent Lamps" (approved Dec. 4, 1999).

¹² "IES Approved Method for the Electrical and Photometric Measurement of Fluorescent Lamps" (approved Jan. 31, 2009).

¹³ "IES Approved Method for the Electrical and Photometric Measurement of General Service Incandescent Filament Lamps" (approved Dec. 14, 2009).

photometric attributes. These changes will not, in DOE's view, significantly alter reported lamp efficacy values.¹⁴

Regarding the second objective, today's final rule establishes a GSIL test procedure for lifetime testing. As noted above, EISA 2007 amended EPCA, in part, by establishing energy conservation standards for GSILs which include for the first time minimum rated lifetime requirements that are to be phased in between January 2012 and January 2014. In order to meet these requirements, this final rule establishes a test procedure for GSIL lifetime that includes incorporation by reference of the industry standard "IESNA Approved Method for Life Testing of Incandescent Filament Lamps," IESNA LM-49-2001;¹⁵ a definition for rated lifetime of GSILs; a sample size of 21 lamps for GSIL lifetime testing; and requirements for laboratory accreditation.

As indicated in greater detail below, these amendments and additions apply to the procedures in 10 CFR part 430, subpart B, Appendix R, and also to sections 10 CFR 429.27, 10 CFR 430.2, 10 CFR 430.23, 10 CFR 430.25. The changes do not affect measured efficacy of GSFLs, GSILs, and IRLs. The amendments to DOE's test procedures in this final rule will take effect 30 days after publication of this final rule.

III. Discussion

¹⁴ In this document, changes in efficacy that are described as "not significant" are considered to be within measurement error or variation. DOE has concluded that these amendments do not affect reported efficacy values to the extent that would warrant modifications to energy conservation standards.

¹⁵ "IESNA Approved Method for Life Testing of Incandescent Filament Lamps" (approved Dec. 1, 2001).

A. Updates to Industry Standards Incorporated by Reference

After reviewing the current industry best practices and technological developments, DOE identified and proposed appropriate updates for the GSFL and GSIL test procedures, but no updates for the IRL test procedure. DOE proposed the following changes to the existing test procedures for GSFLs: (1) updating references of ANSI C78.81-2003 and ANSI C78.81-2005 to ANSI C78.81-2010, which provides dimensional and electrical characteristics of fluorescent lamps; and, (2) updating references of IESNA LM-9-1999 to IES LM-9-2009 for measuring the electrical and photometric attributes of fluorescent lamps. In addition, DOE proposed modifying the existing test procedures for GSILs by updating references of IESNA LM-45-2000 to IES LM-45-2009 for measuring their electrical and photometric attributes of incandescent filament lamps.

As DOE's GSFL, GSIL, and IRL test procedures are based mainly on references to industry standards, when possible, DOE test procedures should reference the latest versions of these standards in order to be aligned with industry standards and practices. Periodic updates to these industry standards generally account for changes in product lines and/or developments in test methodology and equipment. Therefore, in the NOPR analysis, DOE reviewed relevant industry standards and compared versions. DOE found that the latest versions of these standards will increase the precision of measurements and provide clarifications of existing test setup and methodology. DOE determined that these revisions to DOE's regulations would not alter measured energy efficiency nor result in a test procedure that is unduly burdensome to conduct. ((42 U.S.C. 6293(e)(1), 42 U.S.C. 6293(b)(3))

DOE received various comments on its proposed updates to those industry standards already incorporated by reference in DOE's test procedures. The sections below provide a brief summary of the key changes in the updated industry standards and DOE's responses to comments on these changes.

1. ANSI C78.81-2010 for General Service Fluorescent Lamps

In the NOPR, DOE proposed updating all references to ANSI C78.81 in DOE's test procedures and definitions relating to GSFLs and fluorescent lamp ballasts from the 2003 and 2005 editions to the 2010 edition. ANSI C78.81 provides the dimensional and electrical specifications for fluorescent lamps. Adoption of the latest version of ANSI C78.81 will ensure that DOE test procedures reference updated lamp specifications.

DOE concluded in the NOPR analysis that updating to the 2010 version would not change the lamp specifications currently prescribed in DOE's test procedures. The main modification in the 2010 version is the addition of high-frequency and low-frequency lamp specifications for 25W, 28W, and 30W reduced-wattage 4-foot T8 medium bipin lamps. DOE requires testing GSFLs using low-frequency lamp specifications unless only high-frequency lamp specifications are available. The low-frequency ballast specifications for reduced-wattage lamps specified in the 2010 version are identical to those prescribed in the DOE test procedures for 4-foot T8 medium pin lamps.¹⁶ DOE's test procedures also prescribe low-frequency lamp specifications in ANSI C78.81-2003 for certain lamps, which are also identical to those specified in the 2010 version. Therefore, in this final rule, DOE concludes that neither measured efficacy

¹⁶ See section 4.1.2.1 of Appendix R for F40T12, F96T12, F96T12HO, F34T12, F96T12ES, F96T12HO/ES lamps.

nor testing burden would be affected by updating the references to ANSI C78.81-2010 in DOE test procedures.

The National Electrical Manufacturers Association (NEMA) commented that the low frequency reference ballast specifications included in ANSI C78.81 and C78.901 will be replaced with high frequency reference ballast specifications in the next revisions of these standards which are planned for publication in 2012. They added that as a result manufacturers will have to perform testing using low frequency reference ballasts for DOE certification and compliance reporting and high frequency reference ballasts for normative compliance using the updated standards. NEMA suggested coordinating the adoption of DOE's next test procedure with the updated ANSI standards in order to reduce dual testing burden. (NEMA, No. 8 at p. 2)¹⁷

Since the planned versions of ANSI C78.81-2010 and C78.901-2005 to which NEMA is referring were not available for DOE to assess and solicit comment on, DOE cannot reference these scheduled updated versions in this final rule. Therefore, because high-frequency testing specifications are still not yet available for all of DOE's covered fluorescent lamp types, DOE will maintain the requirement to test GSFLs using low-frequency reference lamp specifications unless only high-frequency lamp specifications are available as stated above. Regarding the possibility that manufacturers may have to conduct dual testing (low-frequency testing for DOE compliance and high-frequency testing for normative compliance), DOE is continually monitoring the development of testing standards of GSFLs and will consider amendments to future test procedures including testing on high-frequency reference ballasts as necessary.

¹⁷ A notation in the form "NEMA, No. 29 at p. 2" identifies a written comment that DOE has received and has included in the docket of this rulemaking. This particular notation refers to a comment: (1) submitted by NEMA; (2) in document number 29 of the docket, and (3) on page 2 of that document.

2. IES LM-9-2009 for General Service Fluorescent Lamps

In the NOPR, DOE proposed updating references to IESNA LM-9-1999 which specifies procedures for measuring the efficacy of GSFLs to the 2009 version. DOE's review indicated that incorporating the 2009 edition of IES LM-9¹⁸ would align DOE's requirements with current industry standards; provide further clarification of the test procedure; and improve the test methodology and test instrumentation setup and specifications.

DOE identified the following four key updates to the 2009 edition of IES LM-9: (1) additional information on conducting tests under high-frequency conditions; (2) modification of the lamp stabilization method; (3) added specification of temperature and orientation for stabilization of T5 lamps; and (4) added specification of impedance¹⁹ thresholds for the multipurpose volt, amperes, and watts (VAW) meter and power source. (More detail on these updates can be found in the NOPR. 76 FR 56661, 56665-66.) In the NOPR, DOE concluded that these updates would not significantly affect lamp efficacy or pose a significant testing burden. DOE did not receive any comments regarding the impacts of specific updates in the 2009 version of IES LM-9. DOE did however receive comments from interested parties regarding potential issues with accreditation to the 2009 version of IES LM-9 as well as a request for clarification on the added specifications for T5 lamps and the existing CCT reporting requirement. DOE is also providing further guidance on the lamp stabilization method in this final rule.

¹⁸ The 2009 version of the standard is labeled as IES instead of IESNA

¹⁹ A measure of the total opposition to current flow in an alternating current (AC) circuit made up of resistance and reactance. "Reactance" is the opposition of a circuit element to a change of electric current or voltage, due to the element's capacitance or inductance. For a direct current (DC) circuit, the impedance is just the resistance.

NEMA, Osram Sylvania Inc. (OSI), and Philips Lighting (Philips) commented that many laboratories are not yet accredited to IES LM-9-2009 and would not be able to use the test procedure for compliance testing by the effective date of June 2012. They further noted that it was unclear whether the National Volunteer Laboratory Accreditation Program (NVLAP)²⁰ had begun accrediting to the updated IES version. (NEMA, No. 8 at p. 2; OSI, Public Meeting Transcript, No. 7 at p. 34; Philips, Public Meeting Transcript, No. 7 at pp. 34-35) ICF Consulting on behalf of Energy Star (ICF) noted that there are several accrediting bodies that are already accrediting to IES LM-9-2009. (ICF, Public Meeting Transcript, No. 7 at p. 35)

Testing for GSFLs, IRLs, and GSILs must be conducted by a laboratory accredited by NVLAP or by an accrediting organization recognized by NVLAP. (10 CFR 430.25) At the time this final rule was written, there were ten laboratories accredited to IES LM-9 by NVLAP of which five were accredited to the most recent 2009 version.²¹ DOE has therefore concluded that because several laboratories are already accredited to IES LM-9-2009, compliance with updated test procedures established in this final rule is achievable by June 2012.

The People's Republic of China (P.R. China)²² requested clarification on the orientation of T5 lamps during the seasoning process at 35°C. (P.R. China, No. 9 at p. 3) As stated in IES LM-9-2009, T5 lamps are to be seasoned in the vertical direction in 25°C ambient air so as to obtain stable photometric results. IES LM-9-2009 also specifies that T5 lamps are to be measured horizontally, despite seasoning occurring in the vertical orientation.

²⁰ NVLAP is a program administered by the National Institute of Standards and Technology (NIST).

²¹ Directory of Accredited Laboratories: Energy Efficient Lighting Products,
<http://ts.nist.gov/standards/scopes/eelit.htm>

²² Comment submitted by China WTO/TBT National Notification & Enquiry Center, Standard and Regulation Researching Center, AQSIQ, P.R.China.

NEMA also commented on an existing DOE GSFL test procedure requirement for reporting CCT. NEMA noted that ANSI C78.376²³ guidance recognizes that CCT varies within the allowed chromaticity tolerance ellipse²⁴ for fluorescent lamps and therefore assigns such lamps six separate nominal color temperature ellipses²⁵ and designations. NEMA commented that since fluorescent lamps' chromaticity varies with lifetime, manufacturers design lamps to remain within a designated ellipse. Given these considerations, NEMA requested further clarification on why DOE proposed a requirement to report CCT to the nearest 10 degrees. (NEMA, No. 8 at p. 5)

In the NOPR stage of the 2009 test procedure rule for GSFLs, IRLs, and GSILs, DOE proposed test procedures that required CCT to be rounded to the nearest unit (measured in kelvin (K)). In response to DOE's proposal, NEMA recommended rounding CCT to the nearest 10 degrees because rounding to the nearest degree demonstrates a false level of accuracy. DOE consulted with the National Institute of Standards and Technology (NIST) and agreed with NEMA's conclusion that distinguishing between single digits in CCT is not meaningful. Therefore, because all laboratories were able to measure CCT to three significant figures, DOE required that manufacturers round CCT to the nearest 10 degrees in the July 2009 Test Procedure final rule. 74 FR 31829 (July 6, 2009). DOE finds no reason to modify this requirement.

²³ "American National Standard for electric lamps: Specifications for Chromaticity of Fluorescent Lamps" (approved Feb. 1, 2001).

²⁴ ANSI C78.376-2001 defines chromaticity tolerance by a 4 step MacAdam ellipse which is shown in section 5 of the standard.

²⁵ The six separate nominal color temperature ellipses are defined in section 5 of ANSI C78.376-2001.

Based on comments DOE received questioning whether or not the lamp stabilization method prescribed in IES LM-45-2009 was required, DOE is providing further clarification on the matter in this final rule (see section III.A.3). DOE is also providing this same clarification for the lamp stabilization method prescribed in IES LM-9-2009. The standard states that its prescribed stabilization method is strongly recommended but if not followed, the alternative methodology should be noted in the test report. Therefore, manufacturers should include in certification reports details of any variations from the lamp stabilization method prescribed in IES LM-9-2009.

3. IES LM-45-2009 for General Service Incandescent Lamps

In the NOPR, DOE proposed updating the 2000 version of IESNA LM-45 to the 2009 version. This new version specifies updated procedures for measuring GSIL efficacy. DOE's review indicated that incorporating the 2009 edition of IES LM-45²⁶ would provide further clarification of the test procedure; and improve the test methodology and test instrumentation setup and specifications.

DOE identified the following five key updates in the 2009 edition of IES LM-45: (1) modification of the lamp stabilization method; (2) modification of voltage and current regulation tolerances of the alternating current (AC) power source; (3) modification of instrument tolerance for AC voltage, current, and wattage; (4) establishment of impedance tolerances for instruments; and (5) establishment of a tolerance for the spectral response of the photo-detector. (More detail on these updates can be found in the NOPR. 76 FR 56661, 56666-67.) In the NOPR, DOE concluded that these updates will not significantly affect lamp efficacy or pose a significant

²⁶ The 2009 version of the standard is labeled as IES instead of IESNA

testing burden. NEMA commented that it agreed with the incorporation of IES LM-45-2009. (NEMA, No. 8 at p. 2) DOE did, however, receive comments from interested parties regarding clarification on spectral match specifications and the lamp stabilization method.

At the October 2011 public meeting, Northwest Energy Efficiency Alliance (NEEA) asked for further clarification on the requirement in IES LM-45-2009 that the spectral match between the photo-detector and the $V(\lambda)$ function be within five percent. (NEEA, Public Meeting Transcript, No. 7 at p. 30) The $V(\lambda)$ function or the photopic luminous efficiency function²⁷ is the response curve of a standard human observer. It is the visual sensitivity of the human eye to light at different wavelengths. Photodetectors can only approximate the standard $V(\lambda)$ response due to limitations in the manufacturing process. The parameter f_l' describes the closeness of the spectral of the photodetector measurements and the $V(\lambda)$ function. The parameter f_l' should be within a certain tolerance, but a spectral mismatch correction factor will be applied to the measured result regardless. Therefore in this final rule, DOE concludes that the inclusion of a specific tolerance for spectral match in IES LM-45-2009 would result in more consistent and precise measurements but would not significantly affect lamp efficacy measurements.

In the NOPR, DOE had indicated that industry commonly considers a value for f_l' of less than five percent good commercial quality and a value of less than three percent good laboratory/research quality. Earthjustice asked why the laboratory research quality tolerance of three percent for the f_l' parameter was not proposed as the required tolerance. (Earthjustice, Public Meeting Transcript, No. 7 at p. 37) ICF commented that NVLAP certified laboratories

²⁷ The Commission International de l'Eclairage (CIE) established the photopic luminous efficiency function as the response curve of a standard observer. IESNA Lighting Handbook, Ninth Edition (2000) p. 1-6.

must have two percent tolerance and therefore, three and five percent tolerances would be outside the acceptable range to remain accredited. (ICF, Public Meeting Transcript, No. 7 at p. 38) Based on this information Earthjustice suggested the requirement should be a tolerance of two percent. (Earthjustice, Public Meeting Transcript, No. 7 at p. 38)

DOE has found no reason to lower the spectral match tolerance of five percent established in IES LM-45-2009, a standard based on industry consensus. First, DOE's research indicates that NVLAP does not require a spectral match tolerance different from that prescribed in IES LM-45-2009.²⁸ DOE research shows that manufacturers already employ at least commercial-grade instruments and, therefore, this five percent specification would not pose an additional test burden. Additionally, in certain cases achieving a three percent spectral match is not possible. For example when using the integrating sphere measurement method²⁹ to take photometric measurements, the spectral response of the whole sphere system involves factoring in the sphere paint and the cosine diffuser, rather than just the spectral response of the photodetector. Therefore, achieving a spectral match better than three percent may be too difficult under such circumstances. DOE has concluded that its test procedures do not need to establish a spectral match tolerance different from that prescribed in IES LM-45-2009.

With regards to lamp stabilization³⁰, NEMA commented that test lamps unable to meet the stabilization criteria as defined in IESNA LM-45-2009 after five measurement cycles should

²⁸ Assessment based on interviews with NVLAP and a test lab; and a review of National Institute of Standards and Technology (NIST) Handbook 150:2006 (NVLAP Procedures and General Requirements) or NIST Handbook 150-1:2010-12 ed. (NVLAP Energy Efficient Lighting Products).

²⁹ An integrating sphere is a hollow sphere coated internally with a matte finish, diffusing type material. Light enters the sphere either through a port or by placing the light source inside the sphere. The light is scattered uniformly around the interior of the sphere and can be measured with a detector device connected to the sphere through a port.

³⁰ Lamp stabilization consists of seasoning a lamp and then operating it until it reaches stabilization and temperature equilibrium.

not be disqualified from the test group. Instead, NEMA suggested an analysis of the added uncertainty of the measured performance parameters be taken into account. (NEMA, No. 8 at p. 5) The lamp stabilization method specified in IES LM-45-2009 prescribes continuing sets of five measurements until the stabilization criterion is met. While the IES LM-45-2009 strongly recommends this stabilization method, it also states that a different method is permissible, but that its use should be noted in the test report. DOE is adopting these instructions in IES LM-45-2009. Therefore, as NEMA recommends in its comment, manufacturers can use a variation of the prescribed stabilization method as long any details of the variations from the prescribed methods are retained in the test reports required under 10 CFR Part 429.71.

4. Test Procedures for Incandescent Reflector Lamps

As noted previously, in the NOPR, DOE did not propose updates to DOE's test procedure for IRLs, which incorporates by reference IESNA LM-20-1994.³¹ At the time of publication of the NOPR, a revised edition of this industry standard had not been published. DOE also had concluded in the NOPR analysis that there were no current best practices or technical developments that necessitate modifications to the existing test procedure. DOE did not receive any adverse comments regarding this conclusion. Therefore, no amendments to IRL test procedures have been adopted in this final rule.

Several interested parties noted that DOE will be evaluating the use of an application efficacy metric for IRLs as part of a rulemaking that is revising GSFL and IRL energy conservation standards. (76 FR 56678, September 14, 2011, see Framework Document available at http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/gsfl_irl_ecs_framework.pdf)

³¹ "IESNA Approved Method for Photometric Testing of Reflector-Type Lamp," (approved Dec. 3, 1994).

NEMA commented that efficiency and economic comparisons across directional lamp technologies require the use of an application efficacy metric. NEMA added that replacing the lumens per watt metric with a new application efficacy metric for IRLs would affect lamp efficacy values. (NEMA, No. 8 at p. 3) Interested parties questioned whether the adoption of a new IRL metric would initiate amendments to the existing IRL test procedures. (CA Utilities, Public Meeting Transcript, No. 7 at p. 21, EEI, No. 7 at p. 36) If DOE decides to adopt such a metric, it also will update the IRL test procedure accordingly.

5. Summary of Changes Based on Updated Industry Standards

In the previous sections, DOE has addressed concerns raised regarding the impacts of updates to industry standards incorporated by reference relevant to this rulemaking. Based on its comparison of the updated and older versions of these industry standards, DOE has determined that the more recent versions do not make substantive changes to test setup and methodology, but are clearer and can potentially increase precision and consistency in measurements. Further, DOE has concluded that adopting the latest industry standards would not alter measured energy efficiency nor result in a test procedure that is unduly burdensome to conduct.

Therefore, in this final rule, for GSFLs, DOE is inserting updated references for ANSI C78.81-2003 and ANSI C78.81-2005 to ANSI C78.81-2010 and IESNA LM-9-1999 to IES LM-9-2009. For GSILs, DOE is inserting updated references for IESNA LM-45-2000 to IES LM-45-2009.

B. General Service Incandescent Lamp Lifetime Testing

Section 321 of EISA 2007 amended EPCA by prescribing minimum rated lifetime³² requirements for GSILs, to be phased in between January 2012 and January 2014 (codified at 42 U.S.C. 6295(i)). Therefore, in the NOPR, DOE proposed a test procedure for GSIL lifetime testing, so that manufacturers can certify to DOE that their lamps meet these minimum rated lifetime requirements. DOE received comments on the following aspects of the proposed test procedure: (1) DOE's authority to establish a test procedure; (2) adoption of IESNA LM-49-2001 as an industry reference standard for DOE's GSIL lifetime test procedures; (3) disapproval of accelerated lifetime testing; (4) addressing lifetime measurement of long-life lamps in a 12-month sampling period; (5) determination of rated lifetime definition and appropriateness of the proposed sample size; (6) certification requirements; (7) laboratory accreditation; and (8) cost of GSIL lifetime testing.

1. Authority to Establish Lifetime Test Procedure

NEMA questioned the authority of DOE to require a test procedure for GSIL lifetime testing and opposed the expansion of GSIL test requirements. (NEMA, No. 8 at p. 4; NEMA, Public Meeting Transcript, No. 7 at pp. 60, 63-64) EPCA directs DOE to make a determination that a test procedure should be prescribed that measures energy efficiency, energy use, water use, or estimated annual operating cost of a covered product. (42 U.S.C. 6293(3)) In this case, however, the test is needed to calculate the minimum rated lifetime requirements set forth in EPCA. (42 U.S.C. 6295 (i))

³² DOE has decided to use the term "rated lifetime" rather than "rate lifetime," which is the term used in the statutory standards for GSILs prescribed by EISA 2007. (42 U.S.C. 6295(i)) DOE notes that "rated" is more commonly used in industry.

DOE must establish those test procedures necessary to address all aspects of an energy conservation standard. Therefore, DOE has concluded that it has the authority to establish a test procedure for measuring lamp lifetime of GSILs.

NEMA objected to DOE regulating lamp lifetime which it considers a product reliability metric that has no bearing on efficiency or energy use and affects industry warranties. (NEMA, No. 8 at p. 3) DOE acknowledges NEMA's objection to the lifetime standard, however, as stated in section I, the minimum rated lifetime requirements for GSILs were established by Congress when it passed EISA 2007.

2. Adoption of IESNA LM-49-2001

After conducting literature research and interviews with several GSIL lifetime testing facilities in the NOPR analysis, DOE concluded that IESNA LM-49-2001 is the appropriate industry standard for GSIL lifetime testing. IESNA LM-49-2001 is commonly used in industry and generally aligns with guidance in the IESNA Lighting Handbook. Additionally, IESNA LM-49-2001 is also the standard referenced by the Federal Trade Commission (FTC) in its regulations for product labeling of GSILs, which could minimize testing burden for manufacturers in terms of complying with both Federal energy conservation standards and labeling requirements. 16 CFR 305.5(b) (For further details regarding IESNA LM-49-2001 refer to the NOPR. 76 FR 56661, 56667-68.)

NEMA concurred with using IESNA LM-49-2001 as a reference. (NEMA, No. 7 at p. 3) DOE did not receive any adverse comments regarding adoption of IESNA LM-49-2001 as the industry reference standard for measuring GSIL lifetime.

3. Accelerated Lifetime Testing

In the NOPR, DOE proposed to disallow the use of accelerated lifetime testing in its test procedures. This method is permitted in IESNA LM-49-2001 only for non-halogen GSILs.

Accelerated lifetime testing involves operating lamps at higher than rated voltage, thereby forcing the lamp to fail faster than it would under normal operating conditions. A scaling factor is then used to correlate the measured accelerated lifetime to the lifetime at the rated voltage.

(For more details on DOE's analysis of accelerated lifetime testing refer to the NOPR. 76 FR 56661, 56668.) NEMA agreed with DOE's proposal to disallow accelerated lifetime testing.

(NEMA, No. 8 at p. 3) Some interested parties, noted below, questioned DOE's reasoning for not allowing this method.

DOE proposed to disallow accelerated lifetime testing for several reasons including that IESNA LM-49-2001 prescribes this methodology only for non-halogen lamps, most of which will not meet January 2012 energy conservation standards. DOE did investigate the appropriateness of using accelerated lifetime testing for halogen lamps that would pass the January 2012 standards. DOE found the tungsten-halogen regenerative cycle to be incompatible with accelerated lifetime testing because it cannot achieve its purpose outside of a narrow range of temperatures. The regenerative cycle, intended to increase lamp lifetime by redepositing evaporated tungsten back onto the filament, must operate only at certain operating temperatures. Deviations from the rated voltage in accelerated testing would increase the operating temperature outside this operating range and potentially alter performance or introduce new modes of lamp

failure. Therefore, DOE concluded that lifetimes determined by operating halogen lamps at higher than rated voltage would not reliably measure the actual lifetime.

In the October 2011 public meeting, however, Lutron and OSI commented that the halogen regenerative cycle is critical only at low voltages and temperatures, and is therefore not adversely affected by the high temperature and overvoltage requirements of accelerated lifetime testing. (Lutron, Public Meeting Transcript, No. 7 at p. 47; OSI, Public Meeting Transcript, No. 7 at p. 47) DOE acknowledges that the successful operation of the tungsten halogen regenerative cycle is dependent on low temperatures but has found that high temperatures attained when operating at higher than rated voltage as required in accelerated testing are also an important factor. Operating halogen lamps at higher than rated voltage increases filament temperature and the rate of tungsten evaporation, which results in blackening of the inside lamp wall. Subsequently, the glass temperature rises due to increased infrared absorption and eventually causes the lamp to bulge and leak. Therefore, DOE has concluded that operating halogen lamps at higher than rated voltages and subsequently higher temperatures could introduce modes of lamp failure and may invalidate any comparisons with lamps operating at rated voltage. Hence, in this final rule, DOE maintains the disallowance of accelerated lifetime testing for GSILs as part of DOE test procedures.

P.R. China commented that DOE should adopt the transformation accelerated lifetime testing requirements in IEC 60064-2007. P.R. China cited the stipulation in Article 2.4 of the Technical Barriers to Trade (TBT) agreement that the members should use international standards as the basis of technical rules and regulations. P.R. China also suggested that DOE

employ a method similar to that of the International CFL Harmonization Initiative to make the accelerated lifetime testing standards for GSFLs, GSILs, and IRLs consistent across all countries. (P.R. China, No. 9 at pp. 3-4) Since DOE is disallowing the use of accelerated lifetime testing for GSILs, it will not be adopting any test procedures for this methodology. DOE also notes that there is no U.S. requirement for lifetime testing of GSFLs and IRLs.

4. Measuring Minimum Rated Lifetime

For GSIL lifetime testing, DOE is requiring testing a minimum of three lamps per month each month of production for a minimum of seven months out of a 12-month period. In the October 2011 public meeting, Edison Electric Institute (EEI) expressed concerns that it would be difficult to complete non-accelerated lifetime testing in one year for halogen lamps that have rated lifetimes in the range of 4,000 and 6,000 hours. (EEI, Public Meeting Transcript, No. 7 at pp. 42-43) Measuring the full lifetime of a 6,000-hour lamp would require about 250 days.

In today's final rule, DOE is requiring measurement up to the minimum rated lifetime as prescribed by standards specified in 42 U.S.C. 6295(i). The standards currently require all GSILs to meet a minimum rated lifetime of 1,000 hours. For a model to be in compliance with the prescribed minimum rated lifetime standard, greater than 50 percent of the sample size must meet the minimum rated lifetime required. Manufacturers should follow the procedures set forth in IESNA LM-49-2001 (except for use of the accelerated lifetime testing method) to execute the minimum rated lifetime measurements described above.

5. "Rated Lifetime" Definition and Sample Size

In the NOPR, DOE proposed the following definition for rated lifetime of general service incandescent lamps: the length of operating time of a sample of lamps between first use and failure of 50 percent of the sample size in accordance with test procedures described in IESNA LM-49-2001. Interested parties voiced concern regarding the method of measuring lamp lifetime set forth in the proposed definition.

NEMA stated that the failure rate is a measure of how many lamps are failing per unit time at any given moment and that the 50 percent failure rate is not the definition of median lamp lifetime. NEMA also noted it was common industry practice to use distributional parametric fits such as Weibull or lognormal functions for determining the best estimate of median lifetime and recommended DOE allow the use of this methodology. (NEMA, No. 8 at p. 3)

DOE is using the 50 percent failure rate methodology as it is aligned with the general statutory definition of “life” or “lifetime” as the length of operating time of a statistically large group of lamps between first use and failure of 50 percent of the group (42 U.S.C. 6291(30)(P)). It also coincides with the definition in IESNA LM-49-2001 which states in Section 1.2g that for life rating, the applicable definition of median is the total operating time at which 50 percent of a large group of lamps is still expected to be operating. Therefore, DOE is only revising the definition of rated lifetime for GSILs to provide additional guidance. DOE is maintaining that the rated lifetime is the length of operating time of a sample of lamps between first use and failure of 50 percent of the sample size in accordance with test procedures described in IESNA LM-49-2001. It is also specifying that the operating time be based on the middle lamp operating

time for an odd-numbered sample size and the average operating time of the two middle lamps for an even-numbered sample size.

While NEMA agreed with DOE's proposed minimum sample size of 20 lamps, it stated if DOE adopted the 50 percent failure rate determination for lifetime, the middle lamp of an odd number of samples should be used. (NEMA, No. 8 at p.3-4) In the NOPR, DOE had proposed the minimum sample size of 20 lamps in order to be consistent with the already existing 21-lamp minimum sample size requirement for GSIL performance testing. 10 CFR 429.27. DOE had chosen 20 samples (an even number) instead of 21 samples in order to facilitate the calculation of the 50 percent failure rate. DOE agrees, however, with NEMA that in terms of determining the 50 percent failure at the median lamp lifetime, an odd-numbered sample size is more appropriate. Therefore, DOE is revising the minimum required sample size of 20 lamps proposed in the NOPR to 21 lamps in this final rule.

As with the 21-sampling plan for GSIL performance testing, DOE will require a minimum of three lamps per month each month of production for a minimum of seven months out of a 12-month period. If lamp production occurs in fewer than seven months out of the year, three or more lamps will be selected for each month that production exists as evenly as possible to meet the minimum 21 sample requirement. These seven months do not need to be consecutive and can be any combination of seven months out of the 12.

With regards to the sampling plan, NEMA stated that the existing seven out of 12-month sampling requirement for performance testing should not be the basis for the lifetime sampling

requirement. (NEMA, No. 8 at p. 4; Philips, No. 7 at p. 60) DOE notes that the seven out of 12-month sampling plan was developed with the input of interested parties in a previous test procedure rulemaking on incandescent and fluorescent performance testing. 62 FR 29221, 29229. This seven-month sampling minimum ensures manufacturers are consistently producing lamps that meet standards. DOE finds no reason to differentiate between the performance and lifetime testing sampling plans. Further, using the same sampling plan allows manufacturers the opportunity to test the same sample set for measurements of lumen output, wattage, and lifetime, thereby potentially reducing testing burden.

NEMA also recommended DOE require sampling from the initial production run and thereby prevent fractionated lifetime testing of 12-18 months' time. (NEMA, No. 8 at p. 4) Allowing testing up to the minimum rated lifetime should shorten the time required for lifetime testing. Hence, the continuation of lifetime tests for samples from the last month of production into the following production year should be limited. Therefore, DOE will not be requiring sampling from the initial production run.

6. Certification Requirements

As mentioned previously, to ensure that DOE is in full compliance with Section 315 of Public Law 112-74, DOE will not finalize in this document provisions related to certifying lamps subject to that provision of law. DOE may finalize those procedures at an appropriate time in the future. Described below are issues raised in public comment regarding certification. DOE would respond to these comments if it finalizes these provisions in the future.

In the NOPR, DOE proposed establishing new model filing requirements for GSIL testing similar to those in place for GSFLs and IRLs. These requirements take into account the 12-month sampling requirement for performance and lifetime testing of GSILs by allowing manufacturers to submit an initial certification report prior to or concurrent with distribution of the new model. This initial certification report filing, describing how the manufacturer has determined that the new model meets or exceeds energy conservation standards, will allow manufacturers to distribute new models while completing the 12-month sampling requirement for certification. This initial report is followed by a final certification report, based on the full sampling provisions, which is to be submitted one year after the first date of manufacture of the new model.

Interested parties commented on the proposed certification requirements for GSIL lifetime testing. NEMA requested that DOE accept product compliance at 40 percent of required lifetime. NEMA also stated that the testing should continue until completed and that any non-compliant products should be removed from the market. (NEMA, No. 8 at p. 3; NEMA, Public Meeting Transcript, No. 7 at p. 44-46) DOE finds that the certification process for GSIL lifetime should not cause delays in distribution since manufacturers can submit initial certification reports and are not required to measure the full lifetime of the lamp for compliance. DOE sees no reason to base certification on 40 percent compliance with the lifetime rating.

Instead of on an annual basis, which Phillips believed would pose a significant burden, Philips stated that testing should be required only once for the product unless the product goes

through major changes. (Philips, No. 7 at p. 51) NEMA also strongly recommended testing be required only once and not annually. (NEMA, No. 8 at p. 3)

Regarding certification reports, Lutron requested clarification on how DOE addresses discrepancies between the engineering analysis submitted for the initial certification report and testing conducted for the final certification reports. (Lutron, Public Meeting Transcript, No. 7 at p. 58)

7. Laboratory Accreditation

In the NOPR, DOE proposed that facilities that conduct testing for GSIL lifetime be accredited to NVLAP or an organization recognized by NVLAP. DOE received several stakeholder comments regarding the burden such accreditation would pose on manufacturers. First, NEMA stated the NVLAP-accredited GSIL lifetime testing is a new requirement and manufacturers' accredited laboratories have limited resources for GSIL lifetime testing. Second, NEMA stated that most manufacturers test for lifetime at factory lifetime test facilities that are not NVLAP accredited. Further, these facilities would require significant investment in order to become NVLAP accredited. (NEMA, No. 8 at p. 4) NEMA noted that since NVLAP accredits to efficacy and lifetime standards separately, lifetime testing can be performed at laboratories at plant sites accredited only to the lifetime test standard. Photometry and colorimetry testing would then occur at accredited laboratories on sample sets taken from the same lots. NEMA, however, emphasized costs would still be significant as each plant would need to be accredited for lifetime testing. (NEMA, No. 8 at p. 5)

After further review, DOE has decided not to require NVLAP accreditation for laboratories conducting GSIL lifetime testing. NVLAP accreditation involves ensuring the laboratory is executing testing according to industry reference standards and practices that include an assessment of laboratory equipment and competency of personnel. DOE has not found evidence that NVLAP accreditation for incandescent lifetime testing, which does not require precise measurements, would provide significant value. Further, as noted in the NOPR, NVLAP imposes fees of \$9,000 and \$8,000 on years one and two of accreditation and subsequently, fees alternate between \$5,000 and \$8,000, with the \$8,000 fee corresponding to the on-site evaluation required every other year. Based on the above comments, manufacturers plan to conduct performance testing and lifetime testing at different laboratories, with lifetime testing conducted at plant-level laboratories. These manufacturer-site laboratories have no previous NVLAP accreditations. Hence, manufacturers would have to obtain accreditation at each plant for lifetime testing. DOE has concluded, therefore, that NVLAP accreditation for GSIL lifetime testing would provide few benefits compared to the added costs. Therefore, in this final rule, DOE is not requiring manufacturers to conduct GSIL lifetime testing in a laboratory accredited to NVLAP or an organization recognized by NVLAP. DOE may, however, reevaluate the accreditation requirement for GSIL lifetime testing at a later time.

DOE does require NVLAP accreditation for facilities conducting GSIL energy performance measurements (e.g. lumen output, wattage, CRI) and will continue to do so. The accuracy of such performance measurements are highly dependent on precisely calibrated equipment and test execution that appropriately follows industry reference standards and practices. Further, manufacturers indicated they would be conducting GSIL performance testing

at laboratories that either already have NVLAP accreditation for GSIL performance testing or NVLAP accreditation for other test procedures. In cases where a laboratory has a NVLAP accreditation, the cost of adding accreditation to another test procedure is incremental.

DOE also received several comments regarding the procedural aspects of NVLAP accreditation. ICF commented that IES withdraws test procedures after ten years and therefore, IESNA LM-49-2001 may be out of circulation at the end of 2011 posing a potential problem for laboratories that are not already accredited to the test procedure. (ICF, Public Meeting Transcript, No. 7 at p. 48) As indicated previously, DOE will no longer be requiring NVLAP accreditation to the GSIL lifetime test procedure. DOE notes that ten laboratories are currently accredited by NVLAP to IESNA LM-49-2001 in the United States and these laboratories will continue to be accredited to the test procedure even after it is withdrawn. DOE also verified with NVLAP that additional laboratories may become accredited to IESNA LM-49-2001 even after it is withdrawn.

P.R. China noted that NVLAP and the China National Accreditation Service (CNAS) signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement to accredit testing laboratories based on ISO/IEC 17025. P.R. China requested that DOE allow CNAS accredited laboratories for lifetime and efficiency testing in order to reduce the testing burden. (P.R. China, No. 9 at p. 3) As discussed above, DOE is removing the requirement that GSIL lifetime testing must be conducted at an NVLAP or NVLAP-recognized organization and therefore P.R. China's concerns are unwarranted. DOE does, however, continue to require GSIL performance testing be completed at a laboratory accredited by NVLAP or a

NVLAP-recognized organization, which includes foreign laboratories accredited by foreign accrediting bodies that have mutual recognition agreements through ILAC with NVLAP. 62 FR 29221, 29235

P.R. China also stated that DOE's requirement for NVLAP certification on energy performance tests does not conform to relevant international agreements including Article 2.2 of the TBT which states that members should ensure that adopted technical rules and regulations do not cause unnecessary barriers to international trade. P.R. China suggested that DOE reconsider this certification requirement or provide the scientific basis for it. (P.R. China, No. 9 at p. 4) P.R. China also stated this final rule should become effective after DOE performs a review of the mutual laboratory qualification recognition procedures of World Trade Organization (WTO) member states. P.R. China suggested this approach as a way for DOE to comply with Article 6.3 of the TBT which encourages member states to come to an agreement on recognizing each other's qualification evaluation procedures. (P.R. China, No. 9 at pp. 3-4)

As stated previously, DOE's existing requirements necessitate test facilities that conduct performance testing be NVLAP-accredited or accredited by an organization recognized by NVLAP. This allows for other accreditation organizations that entered into mutual recognition agreements through ILAC with NVLAP to also perform testing. DOE has therefore concluded that the accreditation requirement is not causing trade barriers. Further, DOE finds any additional review of mutual qualification recognition procedures to be unnecessary due to the mutual recognition agreements with NVLAP.

8. GSIL Lifetime Testing Costs

DOE received several comments regarding the burden posed by the cost of GSIL lifetime testing on manufacturers. Philips commented that this cost would pose significant burden on both small and large manufacturers. OSI added that for larger manufacturers the cost would be applicable at each manufacturing location. (Philips, Public Meeting Transcript, No. 7 at p. 62; OSI, Public Meeting Transcript, No. 7 at p. 62) NEMA contended DOE had underestimated GSIL lifetime testing costs in the NOPR. NEMA's own estimates suggest it would require a total initial investment of \$133,000 and labor costs per year of \$60,000 to test 100 basic models at an accredited lifetime test facility with a minimum of 2,000 lifetime test spaces. NEMA noted that most major manufacturers have a portfolio comprising more than 100 products. Additionally, NEMA emphasized preparation for lifetime testing was a significant investment that would have to be incurred in the near future for a mature technology that is being phased out in many areas. (NEMA, No. 8 at pp. 4-5). NEMA also stated that since these costs were not small for large manufacturers that they would pose a significant burden for smaller manufacturers. (NEMA, No. 8 at p. 4)

For this final rule, DOE conducted an independent calculation of GSIL lifetime testing costs. As in the NOPR, DOE based this estimate on the use of a still camera with a programmable snapshot system to record lamp operation. This is less labor intensive and costly than in person inspection. DOE's estimate of initial investment costs included installation labor and equipment for the lamp test racks, voltage regulator, and camera-based monitoring system. DOE also estimated labor costs for conducting the lifetime testing based on an hourly rate of \$100. DOE then developed three separate cost estimates each for a manufacturer producing four,

50, and 100 models and adhering to the sampling requirement of 21 lamps per model. As mentioned in the NOPR, DOE had determined that small manufacturers of GSILs produce anywhere from four to 50 models. Further, DOE found that 100 models was a valid representation for large manufacturer production of general service incandescent lamps.

While NEMA's estimate assumed testing would be conducted for all models at once, DOE's calculations were based on a staggered test approach. DOE determined that over the course of a year, 1,000-hour lifetime tests for four models could be completed with one rack; 50 models with two racks; and 100 models with three racks. For comparison purposes, DOE scaled NEMA's estimates which were based on 20 racks (or testing 100 models at once) down to using one, two and three racks. For four models (one rack), NEMA's scaled-down estimate was about \$10,000 while DOE's estimate was \$13,000. NEMA's scaled-down estimate for 50 models (two racks) was about \$20,000 and DOE's estimate was \$63,000. NEMA's scaled-down estimate for 100 models (three racks) was \$29,000 and DOE's estimate was \$118,000.

Based on DOE's higher estimates, a small manufacturer producing 50 models would have to make an initial investment cost of about \$20,000 and incur labor costs of about \$40,000. In subsequent years, testing costs would be much smaller because only new products or substantially redesigned products would need to be tested. Assuming a conservative estimate of \$1 million in revenue for a small business, initial testing costs would represent about six percent of revenue, but when amortized over subsequent years with little or no testing, testing costs would account for a smaller percentage of revenue. In addition, some businesses may already have lifetime data that could be used for representation purposes from previously completed FTC

labeling testing. Based on these estimates, DOE has concluded that GSIL lifetime testing costs would not pose a substantial burden on small manufacturers. See section IV.B for further analysis of the impacts of this final rule on small manufacturers.

For a large manufacturer producing 100 models, DOE estimates an initial investment cost of \$32,000 and about \$86,000 for labor costs. This total cost is a negligible percentage of a large manufacturer's revenue. Therefore, based on these estimates, DOE has concluded that GSIL lifetime testing would not pose a substantial burden on large manufacturers.

With regards to testing burden, Philips also commented that when considering the products and testing requirements covered in the NOPR, DOE needed to either reduce the number of products that need to be tested or the testing requirements. (Philips, Public Meeting Transcript, No. 7 at p. 63-64) All products covered by standards must be tested for the purpose of compliance. (42 U.S.C. 6295(s)) DOE's test requirements ensure that compliance with these standards can be verified.

9. Summary of GSIL Lifetime Testing

As specified in the sections above, DOE is incorporating IESNA LM-49-2001 as the industry reference standard in this lifetime test procedure, defining rated lifetime, prescribing a minimum sample size of 21, and establishing laboratory accreditation requirements.

C. Effective Date for the Amended Test Procedures

The effective date for these test procedure amendments would be 30 days after publication of the test procedure final rule in the Federal Register. At that time, manufacturers and importers of covered GSFLs, IRLs, and GSILs may use the amended test procedure for making representations of the energy efficiency or energy consumption of each basic model. Additionally, for GSFLs and IRLs, manufacturers may use the amended test procedure or the existing test procedures to certify compliance with DOE's test procedure.

The compliance date for making any representations of the energy efficiency or energy consumption derived from the revised version of the test procedure for GSFLs, IRLs, and GSILs is 180 days from the date of publication of the test procedure final rule in the Federal Register. On or after that date, any manufacturer representations, including those made on marketing materials and product labels, must be based upon results generated under these new and amended test procedures and the applicable sampling plans.

IV. Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866

The Office of Management and Budget has determined that test procedure rulemakings do not constitute "significant regulatory actions" under section 3(f) of Executive Order 12866, Regulatory Planning and Review, 58 FR 51735 (Oct. 4, 1993). Accordingly, this action was not subject to review under the Executive Order by the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB).

B. Review under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 et seq.) requires preparation of an initial regulatory flexibility analysis (IFRA) for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, “Proper Consideration of Small Entities in Agency Rulemaking,” 67 FR 53461 (August 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the DOE rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel’s website: www.gc.doe.gov.

Today’s final rule will adopt test procedure provisions for GSFLs and GSILs, primarily through updates to industry testing standards, as well as specification of a procedure for testing GSIL lifetime. DOE has reviewed the final rule under the provisions of the Regulatory Flexibility Act and the policies and procedures published on February 19, 2003. For the reasons explained below, DOE certifies that the test procedure adopted in today’s final rule would not have a significant economic impact on a substantial number of small entities.

The Small Business Administration (SBA) has set a size threshold for manufacturers of GSFLs, GSILs, and IRLs that defines those entities classified as “small businesses” for the purposes of the Regulatory Flexibility Analysis. DOE used the SBA’s small business size standards to determine whether any small manufacturers of GSFLs, GSILs, and IRLs would be subject to the requirements of the rule. 65 FR 30836, 30849 (May 15, 2000), as amended at 65 FR 53533, 53545 (Sept. 5, 2000) and codified at 13 CFR part 121. The size standards are listed

by North American Industry Classification System (NAICS) code and industry description and are available at www.sba.gov/sites/default/files/Size_Standards_Table.pdf. GSFL, GSIL, and IRL manufacturing is classified under NAICS 335110, “Electric Lamp Bulb and Part Manufacturing.” The SBA sets a threshold of 1,000 employees or less for an entity to be considered as a small business for this category.

For this rulemaking, DOE determined the number of small business U.S. manufacturers of covered GSFLs, GSILs, and IRLs. First, DOE compiled a preliminary list of potential small business manufacturers of GSFLs, GSILs, and IRLs by searching the Hoover’s and the SBA databases and also conducting general searches of the covered products. DOE then sought to determine if the companies identified actually manufactured the covered lamp types. From among the potential GSFL small business manufacturers initially identified, DOE was able to determine by reviewing the company websites that only one company qualified as a small business U.S. manufacturer of covered GSFLs. Similarly, DOE was also able to determine by reviewing company websites that there were no small business U.S. manufacturers of covered IRLs. These results for the number of GSFL and IRL small business U.S. manufacturers is the same as determined in the 2009 GSFL and IRL standards rulemaking. 74 FR 34080, 34174 (July 14, 2009). For GSILs, DOE reviewed company websites and contacted companies as necessary and identified six small business U.S. manufacturers of covered GSILs.

DOE has determined that the updated versions of the industry test methods for GSFLs and GSILs performance testing adopted in this final rule would not result in significant changes in test setup and methodology. The changes in these updated versions modify certain

specifications such as impedance thresholds, voltage and current regulations and provide additional guidance on methods such as lamp stabilization. However, the updates are not making fundamental changes as to how GSFL or GSIL performance testing is conducted. Therefore, DOE has concluded that these changes will not add a significant amount of testing time or require additional test equipment. Further, DOE is not making any revisions to the IRL performance test procedure as there are no relevant updates to industry test methods, current best practices, or technical developments that necessitate modifications. Therefore, DOE has concluded that there will not be a significant economic impact on small business manufacturers of GSFLs, GSILs, and IRLs with regards to performance testing.

For the GSIL lifetime test procedure, DOE determined that GSIL small manufacturers are producing anywhere from four to 50 models of GSILs and provided cost estimates including labor for conducting the testing. DOE received several comments regarding these cost estimates and for this final rule reassessed these estimates for small business manufacturers.

Based on DOE's estimates for this final rule, a small manufacturer producing 50 models would have to make an initial investment cost of about \$20,000 and incur labor costs of about \$40,000. The details of this cost estimate are provided in section III.B.8. In subsequent years, testing costs would be much smaller because only new products or redesigned products would need to be tested. Assuming a conservative estimate of \$1 million in revenue for a small business, initial testing costs would represent about six percent of revenue, but when amortized over subsequent years with little or no testing, testing costs would account for a lesser percentage of revenue. In addition, some businesses may already have lifetime data from previously

completed FTC labeling testing. Based on these reassessed costs, DOE has concluded that the GSIL lifetime test procedure prescribed in this final rule will not result in a significant economic impact on small manufacturers.

Accordingly, DOE has not prepared a regulatory flexibility analysis for this rulemaking. DOE's certification and supporting statement of factual basis has been provided to the Chief Counsel for Advocacy of the SBA for review under 5 U.S.C. 605(b). DOE certifies that this rule would have no significant impact on a substantial number of small entities.

C. Review Under the Paperwork Reduction Act of 1995

The collection-of-information requirement applicable to this rulemaking has been approved by OMB under OMB control number 1910-1400. Public reporting burden for the certification is estimated to average 20 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid OMB Control Number.

D. Review Under the National Environmental Policy Act of 1969

In this final rule, DOE amends its test procedure for GSFLs, GSILs, and IRLs. DOE has determined that this rule falls into a class of actions that are categorically excluded from review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) and DOE's implementing regulations at 10 CFR part 1021. Specifically, this rule amends an existing rule without affecting the amount, quality or distribution of energy usage, and, therefore, will not result in any environmental impacts. Thus, this rulemaking is covered by Categorical Exclusion A5 under 10 CFR part 1021, subpart D, which applies to any rulemaking that interprets or amends an existing rule without changing the environmental effect of that rule. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

E. Review Under Executive Order 13132

Executive Order 13132, "Federalism," 64 FR 43255 (August 4, 1999) imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have Federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have Federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE examined this final rule and determined that it will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. EPCA

governs and prescribes Federal preemption of State regulations as to energy conservation for the products that are the subject of today's final rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297(d)) No further action is required by Executive Order 13132.

F. Review Under Executive Order 12988

Regarding the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, "Civil Justice Reform," 61 FR 4729 (Feb. 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; (3) provide a clear legal standard for affected conduct rather than a general standard; and (4) promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in sections 3(a) and 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this final rule meets the relevant standards of Executive Order 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Pub. L. No. 104-4, sec. 201 (codified at 2 U.S.C. 1531). For a regulatory action resulting in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of \$100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a proposed “significant intergovernmental mandate,” and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820; also available at www.gc.doe.gov. DOE examined today’s final rule according to UMRA and its statement of policy and determined that the rule contains neither an intergovernmental mandate, nor a mandate that may result in the expenditure of \$100 million or more in any year, so these requirements do not apply.

H. Review Under the Treasury and General Government Appropriations Act, 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. Today’s final rule will not have any impact on the autonomy or

integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

DOE has determined, under Executive Order 12630, “Governmental Actions and Interference with Constitutionally Protected Property Rights” 53 FR 8859 (March 18, 1988), that this regulation will not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

J. Review Under Treasury and General Government Appropriations Act, 2001

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. OMB’s guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE’s guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed today’s final rule under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

K. Review Under Executive Order 13211

Executive Order 13211, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,” 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OMB, a Statement of Energy Effects for any significant energy action. A “significant energy action” is defined as any action by an agency that promulgated or is expected to lead to promulgation of a final rule, and that: (1) is a significant regulatory action under

Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (3) is designated by the Administrator of OIRA as a significant energy action. For any significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use if the regulation is implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

Today's regulatory action is not a significant regulatory action under Executive Order 12866. Moreover, it would not have a significant adverse effect on the supply, distribution, or use of energy, nor has it been designated as a significant energy action by the Administrator of OIRA. Therefore, it is not a significant energy action, and, accordingly, DOE has not prepared a Statement of Energy Effects.

L. Review Under Section 32 of the Federal Energy Administration Act of 1974

Under section 301 of the Department of Energy Organization Act (Pub. L. 95–91; 42 U.S.C. 7101), DOE must comply with section 32 of the Federal Energy Administration Act of 1974, as amended by the Federal Energy Administration Authorization Act of 1977. (15 U.S.C. 788; FEAA) Section 32 essentially provides in relevant part that, where a proposed rule authorizes or requires use of commercial standards, the notice of proposed rulemaking must inform the public of the use and background of such standards. In addition, section 32(c) requires DOE to consult with the Attorney General and the Chairman of the Federal Trade Commission (FTC) concerning the impact of the commercial or industry standards on competition.

The final rule incorporates testing methods contained in the following commercial standards: IES LM-9-2009, “IES Approved Method for Electrical and Photometric Measurements of Fluorescent Lamps;” IES LM-45-2009, “IES Approved Method for Electrical and Photometric Measurement of General Service Incandescent Filament Lamps;” IESNA LM-49-2001, “IESNA Approved Method for Life Testing of Incandescent Filament Lamps;” and ANSI C78.81-2010, “American National Standard for Electric Lamps—Double-Capped Fluorescent Lamps—Dimensional and Electrical Characteristics.” DOE has consulted with both the Attorney General and the Chairman of the FTC about the impact on competition of using the methods contained in these standards and has received no comments objecting to their use.

M. Congressional Notification

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of today's rule before its effective date. The report will state that it has been determined that the rule is not a "major rule" as defined by 5 U.S.C. 804(2).

N. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this final rule.

List of Subjects

10 CFR Part 429

Administrative practice and procedure, Buildings and facilities, Business and industry, Energy conservation, Grants programs—energy, Housing, Reporting and recordkeeping requirements, Technical assistance.

10 CFR Part 430

Administrative practice and procedure, Confidential business information, Energy conservation, Household appliances, Imports, Incorporation by reference, Intergovernmental relations, Small businesses.

Issued in Washington, DC, on December 21, 2011.

Kathleen B. Hogan
Deputy Assistant Secretary
Energy Efficiency and Renewable Energy

For the reasons stated in the preamble, DOE amends parts 429 and 430 of Chapter II of title 10 of the Code of Federal Regulations to read as set forth below:

**PART 429—CERTIFICATION, COMPLIANCE, AND ENFORCEMENT FOR
CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT**

1. The authority citation for part 429 continues to read as follows:

Authority: 42 U.S.C. 6291-6317.

2. Section 429.27 is amended by

- a. Removing in paragraph (a)(2)(i) first sentence, “, general service incandescent lamp,”;
- b. Adding in paragraph (a)(2)(ii) introductory text “and general service incandescent lamp” after “general service fluorescent lamp”; and removing the words, “paragraph (a)(2)(i)” and adding in their place, the words, “paragraphs (a)(2)(i) and (a)(2)(iii)”;
- c. Adding new paragraphs (a)(2)(iii) and (a)(2)(iv).

The additions read as follows:

§429.27 General service fluorescent lamps, general service incandescent lamps, and incandescent reflector lamps.

- (a) * * *
- (2) * * *

(iii) For each basic model of general service incandescent lamp, for measurements of rated wattage and rated lumen output, samples of production lamps shall be obtained from a 12-month period, tested, and the results averaged. A minimum sample of 21 lamps shall be tested. The manufacturer shall randomly select a minimum of three lamps from each month of production for a minimum of 7 out of the 12-month period. In the instance where production occurs during fewer than 7 of such 12 months, the manufacturer shall randomly select 3 or more lamps from each month of production, where the number of lamps selected for each month shall be distributed as evenly as practicable among the months of production to attain a minimum sample of 21 lamps. Any represented value of rated wattage of a basic model shall be based on the sample and shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and, \bar{x} is the sample mean; n is the number of samples; and x_i is the i^{th} sample; Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.03, where:

$$UCL = \bar{x} + t_{0.95} \left(\frac{s}{\sqrt{n}} \right)$$

and \bar{x} is the sample mean; s is the sample standard deviation; n is the number of samples; and $t_{0.95}$ is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A to this subpart).

(iv) For each basic model of general service incandescent lamp, for measurements of rated lifetime, a minimum sample of 21 lamps shall be tested. The manufacturer shall randomly select

a minimum of three lamps from each month of production for a minimum of 7 out of the 12-month period. In the instance where production occurs during fewer than 7 of such 12 months, the manufacturer shall randomly select three or more lamps from each month of production, where the number of lamps selected for each month shall be distributed as evenly as practicable among the months of production to attain a minimum sample of 21 lamps. The lifetime shall be represented as the length of operating time between first use and failure of 50 percent of the sample size, in accordance with test procedures described in section 4.2 of Appendix R to subpart B of part 430 of this chapter. Compliance will be determined by the percentage of sample size that meets the minimum rated lifetime.

* * * * *

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

3. The authority citation for part 430 continues to read as follows:

Authority: 42 U.S.C. 6291–6309; 28 U.S.C. 2461 note.

4. Section 430.2 is amended by:

- a. Removing in paragraph (2) of the definition of “*Colored fluorescent lamp*” the words “IESNA LM–9” and adding in its place “IES LM–9”; and
- b. Adding in alphabetical order the definition of “*Rated lifetime for general service incandescent lamps*” to read as follows:

§ 430.2 Definitions.

* * * *

Rated lifetime for general service incandescent lamps means the length of operating time of a sample of lamps (as defined in §429.27(a)(2)(iv) of this chapter) between first use and failure of 50 percent of the sample size in accordance with test procedures described in IESNA LM-49 (incorporated by reference; see §430.3), as determined in section 4.2 of Appendix R of this subpart. The operating time is based on the middle lamp operating time for an odd number of samples and the average operating time of the two middle lamps for an even number of samples.

* * * *

5. Section 430.3 is amended by:

- a. Removing paragraph (c)(5) and redesignating paragraphs (c)(6) through (c)(19) as paragraphs (c)(5) through (c)(18);
- b. Revising the newly redesignated paragraph (c)(5);
- c. Revising paragraphs (k)(2) and (k)(5); and
- d. Redesignating paragraph (k)(6) as (k)(7) and adding new paragraph (k)(6).

The revisions and additions read as follows:

§ 430.3 Materials incorporated by reference.

* * * *

(c) *ANSI.* * * *

(5) ANSI_ANSLG C78.81–2010, (“ANSI C78.81”), American National Standard for Electric Lamps—Double-Capped Fluorescent Lamps— Dimensional and Electrical Characteristics,

approved January 14, 2010, IBR approved for §430.2, §430.32, appendix Q, appendix Q1, and appendix R to subpart B.

* * * * *

(k) *IESNA*. * * *

(2) IES LM–9–09, (“IES LM–9”), IES Approved Method for the Electrical and Photometric Measurement of Fluorescent Lamps, approved January 31, 2009; IBR approved for §430.2 and appendix R to subpart B.

* * * * *

(5) IES LM–45–09, (“IES LM–45”), IES Approved Method for the Electrical and Photometric Measurement of General Service Incandescent Filament Lamps, approved December 14, 2009; IBR approved for appendix R to subpart B.

(6) IESNA LM-49-01 (“IESNA LM-49”), IESNA Approved Method for Life Testing of Incandescent Filament Lamps, approved December 1, 2001, IBR approved for §430.2 and appendix R to subpart B.

* * * * *

6. Section 430.23 is amended by adding paragraph (r)(6) to read as follows:

§ 430.23 Test procedures for the measurement of energy and water consumption.

* * * * *

(r) * * *

(6) The rated lifetime for general service incandescent lamps shall be measured in accordance with test procedures described in section 4.2 of Appendix R of this chapter. A lamp shall be compliant with standards if greater than 50 percent of the sample size specified in §429.27 meets the minimum rated lifetime as specified by energy conservations standards for general service incandescent lamps.

* * * * *

7. Section 430.25 is revised to read as follows:

§ 430.25 Laboratory Accreditation Program.

Testing for fluorescent lamp ballasts performed in accordance with appendix Q1 to this subpart shall comply with this §430.25. The testing for general service fluorescent lamps, general service incandescent lamps, and incandescent reflector lamps shall be performed in accordance with Appendix R to this subpart. The testing for medium base compact fluorescent lamps shall be performed in accordance with Appendix W of this subpart. This testing, with the exception of lifetime testing of general service incandescent lamps, shall be conducted by test laboratories accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) or by an accrediting organization recognized by NVLAP. NVLAP is a program of the National Institute of Standards and Technology, U.S. Department of Commerce. NVLAP standards for accreditation of laboratories that test for compliance with standards for fluorescent lamp ballast luminous efficiency (BLE), lamp efficacy, lamp lifetime, and fluorescent lamp CRI are set forth in 15 CFR part 285. A manufacturer's or importer's own laboratory, if accredited, may conduct the applicable testing. Testing for BLE may also be conducted by laboratories accredited by

Underwriters Laboratories or Council of Canada. Testing for fluorescent lamp ballasts performed in accordance with Appendix Q to this subpart is not required to be conducted by test laboratories accredited by NVLAP or an accrediting organization recognized by NVLAP.

8. Appendix Q to subpart B of part 430 is amended by revising sections 1.5 through 1.10 and 2.1 to read as follows:

Appendix Q to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Fluorescent Lamp Ballasts

1. *Definitions*

* * * * *

1.5 F40T12 lamp means a nominal 40 watt tubular fluorescent lamp which is 48 inches in length and one and a half inches in diameter, and conforms to ANSI C78.81 (Data Sheet 7881–ANSI–1010–1) (incorporated by reference; see §430.3).

1.6 F96T12 lamp means a nominal 75 watt tubular fluorescent lamp which is 96 inches in length and one and a half inches in diameter, and conforms to ANSI C78.81 (Data Sheet 7881–ANSI–3007–1) (incorporated by reference; see §430.3).

1.7 F96T12HO lamp means a nominal 110 watt tubular fluorescent lamp that is 96 inches in length and one and a half inches in diameter, and conforms to ANSI C78.81 (Data Sheet 7881–ANSI–1019–1) (incorporated by reference; see §430.3).

1.8 F34T12 lamp (also known as a “F40T12/ES lamp”) means a nominal 34 watt tubular fluorescent lamp that is 48 inches in length and one and a half inches in diameter, and conforms to ANSI C78.81 (Data Sheet 7881–ANSI–1006–1) (incorporated by reference; see §430.3).

1.9 F96T12/ES lamp means a nominal 60 watt tubular fluorescent lamp that is 96 inches in length and one and a half inches in diameter, and conforms to ANSI C78.81 (Data Sheet 7881–ANSI–3006–1) (incorporated by reference; see §430.3).

1.10 F96T12HO/ES lamp means a nominal 95 watt tubular fluorescent lamp that is 96 inches in length and one and a half inches in diameter, and conforms to ANSI C78.81 (Data Sheet 7881–ANSI–1017–1) (incorporated by reference; see §430.3).

* * * * *

2. *Test Conditions.*

2.1 *Measurement of Active Mode Energy Consumption, BEF.* The test conditions for testing fluorescent lamp ballasts shall be done in accordance with ANSI C82.2 (incorporated by reference; see §430.3). Any subsequent amendment to this standard by the standard setting organization will not affect the DOE test procedures unless and until amended by DOE. The test conditions for measuring active mode energy consumption are described in sections 4, 5, and 6 of ANSI C82.2. The test conditions described in this section (2.1) are applicable to section 3.1 of section 3, Test Method and Measurements. For section 2.1 and 3, ANSI C78.81 (incorporated by reference; see §430.3), ANSI C82.1 (incorporated by reference; see §430.3), ANSI C82.11 (incorporated by reference; see §430.3), and ANSI C82.13 (incorporated by reference; see §430.3) shall be used when applying ANSI C82.2 instead of the versions listed as normative references in ANSI C82.2.

* * * * *

9. Appendix Q1 to subpart B of part 430 is amended by revising sections 2.1, 2.3.1, and 2.4.1 to read as follows:

Appendix Q1 to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Fluorescent Lamp Ballasts

* * * * *

2. Active Mode Procedure

2.1. Where ANSI C82.2 (incorporated by reference; see §430.3) references ANSI C82.1–1997, the operator shall use ANSI C82.1 (incorporated by reference; see §430.3) for testing low-frequency ballasts and shall use ANSI C82.11 (incorporated by reference; see §430.3) for testing high-frequency ballasts. In addition when applying ANSI C82.2, ANSI C78.81 (incorporated by reference; see §430.3), ANSI C82.1 , ANSI C82.11 , and ANSI C82.13 (incorporated by reference; see §430.3) shall be used instead of the versions listed as normative references in ANSI C82.2.

* * * * *

2.3. Test Setup

2.3.1. The ballast shall be connected to a main power source and to the fluorescent lamp load according to the manufacturer's wiring instructions and ANSI C82.1 (incorporated by reference; see §430.3) and ANSI C78.81 (incorporated by reference; see §430.3).

* * * * *

2.4. Test Conditions

2.4.1. The test conditions for testing fluorescent lamp ballasts shall be done in accordance with ANSI C82.2 (incorporated by reference; see §430.3). DOE further specifies that the following revisions of the normative references indicated in ANSI C82.2 should be used in place of the references directly specified in ANSI C82.2: ANSI C78.81 (incorporated by reference; see §430.3), ANSI C82.1 (incorporated by reference; see §430.3), ANSI C82.3 (incorporated by reference; see §430.3), ANSI C82.11 (incorporated by reference; see §430.3), and ANSI C82.13 (incorporated by reference; see §430.3). All other normative references shall be as specified in ANSI C82.2.

* * * * *

10. Appendix R to subpart B of part 430 is amended by:

- a. Revising sections 2.1, 2.9, 3.1, 3.2, 4.1.1, 4.2.1, 4.2.2, and, 4.4.1;
- b. Adding new sections 4.2.3 and 4.2.3.1; and
- c. Removing section 4.5.

The revisions and additions read as follows:

Appendix R to Subpart B of Part 430—Uniform Test Method for Measuring Average Lamp Efficacy (LE), Color Rendering Index (CRI), Correlated Color Temperature (CCT), and Lamp Lifetime of Electric Lamps

* * * * *

2. Definitions

2.1 To the extent that definitions in the referenced IESNA and CIE standards do not conflict with the DOE definitions, the definitions specified in section 3.0 of IES LM–9 (incorporated by reference; see §430.3), section 3.0 of IESNA LM–20 (incorporated by reference; see §430.3), section 3.0 and the Glossary of IES LM–45 (incorporated by reference; see §430.3), section 2 of IESNA LM–58 (incorporated by reference; see §430.3), and Appendix 1 of CIE 13.3 (incorporated by reference; see §430.3) shall be included.

* * * * *

2.9 *Reference condition* means the test condition specified in IES LM–9 for general service fluorescent lamps, in IESNA LM–20 for incandescent reflector lamps, and in IES LM–45 for general service incandescent lamps .

3. *Test Conditions*

3.1 *General Service Fluorescent Lamps*: For general service fluorescent lamps, the ambient conditions of the test and the electrical circuits, reference ballasts, stabilization requirements, instruments, detectors, and photometric test procedure and test report shall be as described in the relevant sections of IES LM–9 (incorporated by reference; see §430.3).

3.2 *General Service Incandescent Lamps*: For general service incandescent lamps, the selection and seasoning (initial burn-in) of the test lamps, the equipment and instrumentation, and the test conditions shall be as described in IES LM–45 (incorporated by reference; see §430.3).

* * * * *

4. *Test Methods and Measurements* * * *

4.1.1 The measurement procedure shall be as described in IES LM–9 (incorporated by reference; see §430.3), except that lamps shall be operated at the appropriate voltage and current conditions as described in ANSI C78.375 (incorporated by reference; see §430.3) and in ANSI

C78.81 (incorporated by reference; see §430.3) or ANSI C78.901 (incorporated by reference; see §430.3), and lamps shall be operated using the appropriate reference ballast at input voltage specified by the reference circuit as described in ANSI C82.3 (incorporated by reference; see §430.3). If, for a lamp, both low-frequency and high-frequency reference ballast settings are included in ANSI C78.81 or ANSI C78.901, the lamp shall be operated using the low-frequency reference ballast.

* * * * *

4.2 *General Service Incandescent Lamps*

4.2.1 The measurement procedure shall be as described in IES LM-45 (incorporated by reference; see §430.3). Lamps shall be operated at the rated voltage as defined in §430.2.

4.2.2 The test procedure shall conform to sections 6 and 7 of IES LM-45 , and the lumen output of the lamp shall be determined in accordance with section 7 of IES LM-45. Lamp electrical power input in watts shall be measured and recorded. Lamp efficacy shall be determined by computing the ratio of the measured lamp lumen output and lamp electrical power input at equilibrium for the reference condition. The test report shall conform to section 8 of IES LM-45.

4.2.3 The measurement procedure for testing the lifetime of general service incandescent lamps shall be as described in IESNA LM-49 (incorporated by reference; see §430.3). The lifetime measurement shall be taken by measuring the operating time of a lamp, expressed in hours, not including any off time. The percentage of the sample size that meets the minimum rated lifetime shall be recorded. The lamp shall be deemed to meet minimum rated lifetime standards if greater than 50 percent of the sample size specified in §429.27 meets the minimum rated lifetime.

4.2.3.1 Accelerated lifetime testing is not allowed. The second paragraph of section 6.1 of IESNA LM-49 is to be disregarded.

* * * * *

4.4 *Determination of Color Rendering Index and Correlated Color Temperature*

4.4.1 The CRI shall be determined in accordance with the method specified in CIE 13.3 (incorporated by reference; see §430.3) for general service fluorescent lamps. The CCT shall be determined in accordance with the method specified in IES LM-9 (incorporated by reference; see §430.3) and rounded to the nearest 10 kelvin for general service fluorescent lamps. The CCT shall be determined in accordance with the CIE 15 (incorporated by reference; see §430.3) for incandescent lamps. The required spectroradiometric measurement and characterization shall be conducted in accordance with the methods set forth in IESNA LM-58 (incorporated by reference; see §430.3).

* * * * *

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